



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/655,946	09/04/2003	Tong Xie	10030187-1	7020
57299	7590	12/05/2006	EXAMINER	
AVAGO TECHNOLOGIES, LTD. P.O. BOX 1920 DENVER, CO 80201-1920			SHERMAN, STEPHEN G	
			ART UNIT	PAPER NUMBER
			2629	

DATE MAILED: 12/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/655,946	XIE ET AL.	
	Examiner	Art Unit	
	Stephen G. Sherman	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3, 12 and 22 is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-11, 13-18, 20-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed the 12 September 2006. Claims 1-18 and 20-22 are pending. Claim 19 is cancelled.

Response to Arguments

2. Applicant's arguments filed the 12 September 2006 have been fully considered but they are not persuasive.

Applicant argues on page 10, first paragraph that Liou does not teach of comparing two such images to produce motion signals, however, as the examiner understands the Liou reference, as shown in Figures 5 and 6, that when axial displacement occurs such as the device moving from the status E to status F, the imagery lens would have taken the image of the device at the two locations, and the movement signals changing from [1,1] to [1,0] would occur based on the movement detected in the images taken by the device.

Applicant argues on page 10, second paragraph that Liou does not teach that the images are formed at a specified rate. The examiner respectfully disagrees. The applicant states that Liou outputs the image continuously to the device attached thereto, however, continuously taking an image is essentially impossible. Images can only be taken "continuously" with respect to the human eyes. In reality, all imagery apparatuses operate at some kind of frequency at which the images are updated. This means while

the applicant says that Liou teaches that the images are “continuous” there is actually a specific rate at which the images are taken in Liou.

Applicant argues on page 10, third paragraph that the pattern produced on the sensors is not an image of the surface, but rather a mathematical construct produced from the image. The examiner respectfully disagrees. Column 4, lines 32-50 explain that the image of the grid pad is magnified then focused on the sensor array. Therefore the image is only MAGNIFIED onto the sensors, meaning that the pattern produced on the sensors is an image.

Applicant argues on page 10, fourth paragraph that Liou does not teach of determining the correlation of the first and second frames. The examiner respectfully disagrees. A correlation value is only a value that is a measure of a relationship between two variables, therefore, as admitted by the applicant, Liou compares the output to a previous value, meaning that he determines a correlation value.

Applicant argues on page 11, second paragraph that the examiner has not made a *prima facie* case for obviousness with respect to claim stating that the combination of the two references would be a device in which the light source used to illuminate the grid pattern in the device of Liou has a variable intensity that is controlled by a controller in the apparatus of Liou. The examiner respectfully disagrees. Lauffenburger was used to teach of providing illumination onto a surface in response to an optical motion detection circuit detecting insufficient illumination of the surface. Liou already teaches of possible having two light sources 10 and 10' as shown in Figures 1-2. Therefore in combination Lauffenburger was only used to teach that one of the light sources taught

by Liou could be made to have its power, i.e. light illumination, increased if a detected illumination was deemed too low, which would improve accuracy in the optical navigation of the device if the other light source were to become inactive.

In response to applicant's argument that the examiner has not made a *prima facie* case for obviousness with respect to claims 8 and 16, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The examiner only used the Mumford reference to teach of a light pen system in which the surface that is detected is a liquid crystal device to show that the surface used for detection in the Liou reference could be made to be a liquid crystal surface in order to provide a light pen system in which the writing/detection tablet is not physically separated from the display screen.

Applicant argues on page 13, second paragraph that the light pen of Minn does not detect the shadow mask. The examiner respectfully disagrees. Since the light pen of Minn determines the position when it detects light, and the electron beam diameter after passing through the shadow mask determines the pixel sizes and light emitted, the shadow mask is detected.

In response to applicant's argument in the third and fourth paragraphs of page 13, the test for obviousness is not whether the features of a secondary reference may

Art Unit: 2629

be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The examiner only used the Minn reference to teach of an apparatus for use with a light pen in which the surface that is detected is a CRT to show that the surface used for detection in the Liou reference could be made to be a CRT surface in order to provide a light pen system in which the writing/detection tablet is not physically separated from the display screen.

The applicant argues on page 14, that there is no teaching in Ditzik that the optional diffuser plate has a detectable texture, however, since as admitted by the applicant, the diffuser plate scatters particles having dimensions of the order of the wavelength of the light from the light source, and only the pixels that are open at any given time allow for the diffuser plate to be visible. This means that when pixels are activated by the display image, a pattern is displayed of the diffuser plate for those pixels.

In response to applicant's argument in the last paragraph of page 14, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The examiner only used the Ditzik reference to teach of an apparatus for use with a light pen in which the surface that is detected is a liquid crystal display in which the detectable texture is that of the diffuser plate to show that the surface used for detection in the Liou reference could be made to be a liquid crystal display surface in order to provide a light pen system in which the writing/detection tablet is not physically separated from the display screen.

In response to applicant's argument in the third and fourth paragraphs of page 15, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The examiner only used the Burns to show that that illuminated surface is overlaid with a semi-transparent layer comprising a detectable pattern with absolute position indication. The examiner never stated that the actual pattern of Burns would be used in place of the pattern of Burns, but that the idea of having a overlay could be used such that optical navigation could be provided on a surface or a display in which there was no pre-existing surface already on it.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 11 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Liou (US 5,086,197).

Regarding claims 1 and 11, Liou discloses an apparatus and electronic device for optical navigation on a display screen (Fig. 1, item 11, where the grid pad displays the grid lines) comprising:

a surface comprising an aperture (Fig. 2, the stylus depicted here has an aperture on the surface in contact with surface 11 so that light may reach inside the device),

said surface configured to be moveable against an illuminated surface or a display screen (Fig. 2, see col. 2, lines 45-46, where the grid pad 11 is the illuminated surface and the display screen receiving the projected light) having a detectable texture (see Fig. 9, the grid lines on grid pad 11 constitute a detectable texture);

an optical motion detection circuit integral to said apparatus (see col. 3, lines 29-32, or col. 4, lines 15-16) and optically coupled to said detectable texture of said

Art Unit: 2629

illuminated surface (see col. 4, lines 33-35, where the grid pad 11 is optically coupled to the detection circuit because the movement of the lines on grid pad 11 are being tracked),

said optical motion detection circuit comprising a single detector (see col. 3, lines 18, where the sensors 14, 14', 16, 16' constitute a single array, which is a single detector) for acquiring images of said surface at a specified rate (it is inherent that an image detector acquires images at a specified rate),

said detector acquiring a single image at a time (Fig. 6, where a combination of images from sensor array 14, 14', 16, 16' constitutes a single image as shown in the figure), and comprising an image processor producing motion signals indicative of motion of said surface relative to said detectable texture of said illuminated surface (Fig. 6, see col. 4, lines 3-9),

wherein said motion signals are produced by comparing two said images and comprise a change in location in a first axis and a change in location in a second axis (see col. 4, lines 3-9),

wherein said optical motion detection circuit is operable to detect said detectable texture without requiring an integral illumination source (Fig. 1, see col. 2, line 52-54, and see col. 5, lines 64-68, where the having the light 10' below the surface with a translucent grid pad 11 is an option without requiring a light source inside the device.)

Regarding claim 2, Liou discloses the apparatus as recited in claim 1 further comprising

an optical element integral to said apparatus (Fig. 2, item 12),
said optical element proximate said aperture (Fig. 2) and receiving light from said detectable texture of said illuminated surface (Fig. 2),
said optical element operable to optically couple said optical motion detection circuit integral to said detectable texture of said illuminated surface (Fig. 2, the lens 12 transmits the image to the lenses 13 and 15, and then to the motion detection circuitry 14 and 16).

Regarding claim 20, Liou discloses a method for optical navigation on an illuminated surface using an electronic device, said method comprising:

acquiring a first frame from said illuminated surface (Fig. 6E, where each capture 11 is a “frame”) at a single detector (see col. 3, lines 18, where the sensors 14, 14’, 16, 16’ constitute a single array, which is a single detector) of said electronic device, such that said electronic device does not require an internal illumination source to provide illumination to said illuminated surface (Fig. 1, see col. 2, line 52-54, and see col. 5, lines 64-68, where the having the light 10’ below the surface with a translucent grid pad 11 is an option without requiring a light source inside the device);

acquiring a second frame at said single detector from said illuminated surface (Fig. 6F);

determining a change in position in a first axis and in a second axis of said electronic device relative to said illuminated surface based on said first frame and said second frame (see col. 4, lines 3-9),

Art Unit: 2629

wherein said determining a change in position comprises:

computing correlation values for said first frame and said second frame (see col. 3, lines 46-65, where the values "1" and "0" assigned to the position of the device are correlation values),

after said second frame has been shifted along one of said axes to determine an indication of movement of said electronic device from said first frame to said second frame (The examiner interprets that since the first image and second image taken are what is being compared, that after the first frame has been shifted, i.e. the device has been moved and the image already acquired, then the comparison takes place between the two images and the movement is then indicative of the correlation between the two images.);

predicting a shift in position from said first frame based on said correlation values (see col. 3, lines 46-65, where the displacement signals described here a shift from the first frame 'A'); and

outputting a motion signal indicating said shift in position (col. 3, lines 43-65, where the signals 'A'-'D' are motion signals indicating shift in position).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2629

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 4 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Lauffenburger et al. (US 6,963,059).

Regarding claim 4, Liou discloses the apparatus as recited in claim 1.

Liou fails to teach a supplemental light source operable to provide additional illumination onto said illuminated surface in response to said optical motion detection circuit detecting insufficient illumination of said illuminated surface.

Lauffenburger et al. disclose a light source (Fig. 2, item 10) that provides illumination onto a surface in response to an optical motion detection circuit detecting insufficient illumination of the surface (see col. 8, lines 6-12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Lauffenburger et al. in the teachings of Liou to have a supplemental light source integral to the navigation device that could

increase the power of said supplemental light source if the detected illumination was deemed too low to improve accuracy in the optical navigation.

Regarding claim 21, Liou discloses a method as recited in claim 20.

Liou fails to teach a method for determining whether illumination provided by said illuminated surface sufficient for said acquiring said first frame; and provided said illumination provided by said illuminated surface is not sufficient for said acquiring said first frame, providing additional illumination onto said illuminated surface.

Lauffenburger et al. disclose a method for optimizing illumination in an optical sensing device that comprises determining whether illumination provided by said illuminated surface sufficient for acquiring a first frame (col. 7, line 15-17, and col. 8, lines 6-12, where each flash is considered a “frame” and detection of any frame can be considered a “first frame” relative to the time when a low light level is detected); and provided said illumination provided by said illuminated surface is not sufficient for said acquiring said first frame, providing additional illumination onto said illuminated surface(col. 8, lines 6-12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Lauffenburger et al. in the teachings of Liou to have a supplemental light source integral to the navigation device that could increase the power of said supplemental light source if the detected illumination was deemed too low to improve accuracy in the optical navigation.

7. Claim 5, 8, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Mumford (US 6,377,249).

Regarding claims 5 and 13, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an internal power source for providing power to said apparatus.

Mumford discloses a light pen comprising an internal power source for providing power to said apparatus (Fig. 21, item 216, see col. 16, line 12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Mumford in the teachings of Liou to have a device that includes a battery as a power supply so that an external power source would not be necessary.

Regarding claims 8 and 16, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus wherein said illuminated surface is a liquid crystal display and wherein said detectable texture comprises pixels of said liquid crystal display.

Mumford discloses a light pen system wherein said illuminated surface is a liquid crystal display (col. 1, line 11) and wherein said detectable texture comprises pixels of said liquid crystal display (col. 7, line 62 to col. 8, line 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Mumford in the teachings of Liou to have a detectable texture comprising pixels of a liquid crystal display so that a liquid crystal display device can be used as the illuminated surface.

8. Claims 6 and 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Minn (US 4,565,947).

Regarding claims 6 and 14, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus wherein said illuminated surface is a cathode ray tube and wherein said detectable texture is a shadow mask of said cathode ray tube.

Minn discloses an apparatus for use with a light pen where the illuminated surface is a cathode ray tube (co. 4, line 12) and said detectable texture is a shadow mask of said cathode ray tube (col. 2, lines 56-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Minn in the teachings of Liou to

Art Unit: 2629

have a device that reads the shadow mask of a cathode ray tube so that it can be used directly on the display surface of a cathode ray tube.

9. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Ditzik (US 5,771,039).

Regarding claims 7 and 15, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus where the illuminated surface is a liquid crystal display and wherein said detectable texture is a diffuser plate of said liquid crystal display.

Ditzik discloses a display device for use with pen/stylus input devices where the illuminated apparatus is a liquid crystal display (Fig. 6A, see col. 7, line 55) and wherein said detectable texture is a diffuser plate of said liquid crystal display (Fig. 6A, item 43, see col. 8, line 64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Ditzik in the teachings of Liou to have a liquid crystal display with a diffuser plate as the illuminated surface in order to utilize a commonly used display device and to have a diffuser to even distribute the backlight over the screen area.

10. Claims 9, 10, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Burns (US 5,442,147).

Regarding claims 9 and 16, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus where wherein said illuminated surface is overlaid with a semi-transparent layer comprising said detectable texture.

Burns discloses a position-sensing apparatus comprising an illuminated surface (Fig. 31, item 30) overlaid with a semi-transparent layer (Fig. 31, item 14, see col. 43, lines 59-64) comprising said detectable texture (Fig. 31, item 20, see col. 43, line 59 to col. 44 line 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Burns in the teachings of Liou to have a pattern with a detectable texture overlaid on the illuminated surface in order to be able to use an illuminated surface or display screen for optical navigation where there was no pre-existing detectable surface on it already.

Regarding claim 10 and 18, Liou and Burns disclose the apparatus as recited in claim 9 and the electronic device for optical navigation on a display screen as recited in claim 17.

Burns also discloses a semi-transparent layer comprising unique positioning information (Fig. 1B, item 15) providing absolute position information of said apparatus relative to said illuminated surface or display screen (see col. 7, lines 10-33).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Burns in the teachings of Liou to have a pattern with a detectable texture overlaid on the illuminated surface in order to be able to use an illuminated surface or display screen for optical navigation where there was no pre-existing detectable surface on it already.

Allowable Subject Matter

11. Claims 3, 12 and 22 are allowed.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

Art Unit: 2629

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen G. Sherman whose telephone number is (571) 272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SS

Application/Control Number: 10/655,946

Page 19

Art Unit: 2629

1 December 2006

AMB A. AWAD
SUPERVISORY PATENT EXAMINER
Amr Ahmed Awad